MICROBIAL INFLUENCED PYRITISATION OF MARINE SPONGES. *Memoirs of the Queensland Museum 44: 550. 1999:-* Although biomineralisation plays an important role in the history of earth, our knowledge about the involved processes is rather limited. In this context

microorganisms take a significant part within these global processes. Pyrite crystals are often found in taphonomically mineralised sponge tissues but are absent or rare in the surrounding sediment. In terms of microbiology, the role of sponge-associated, anaerobic species such as sulfate reducing and fermentative bacteria is fairly unknown. During early decaying processes of the sponge tissue the internal sponge becomes entirely anaerobic which is a necessary prerequisite for the growth and metabolical activity of the sulfate reducers. Therefore, pyrite formation is probably linked with sulfide producing bacteria. In the marine environment, sulfate reducing bacteria are most likely to play this role besides heterotrophic sulfidogenic bacteria. In this study enrichment cultures of native sponge tissue of the mediterranean sponges *Chondrosia reniformis* and *Petrosia ficiformis* under sulfate reducing conditions were investigated using a combination of rRNA-targeted *in situ* probing and classical cultivation techniques. Recently developed specific oligonucleotide probes for sulfate reducing bacteria elucidated the occurrence and abundance of various sulfate reducing-species affiliated to different phylogenetic taxa within the Desulfovibrionaceae and Desulfobacteriaceae. Furthermore, 16S-rRNA based phylogeny revealed to hitherto unknown anaerobic bacteria inhabiting the sponge mesohyl. Additionally, the sulfate reducing activity was confirmed by established physiological methods. In living sponges, sulfate reducing bacteria were evenly distributed within the tissue. This indicates the presence of anoxic microniches, which allow not only the survival, but even the subsequent growth of these anaerobic bacteria. Further investigations of culturable sponge-associated sulfate reducing bacteria are currently carried out to investigate their ecology and ability to produce pyrit in culture. ❐ *Porifera, biomineralisation, pyritisation, anaerobic microbes, sulphate reducing bacteria, phylogeny, molecular biology, microniches.*

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